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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
TURK, NEIL N	
ART UNIT	**PAPER NUMBER**
1773	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/529,227	HARRIS ET AL.
	Examiner	Art Unit
	NEIL TURK	1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (6,383,451) in view of Ansuini (4,780,664).

Kim discloses an electric resistance sensor for measuring corrosion rate. Kim discloses an electric resistance sensor, which includes a plurality of corrosive tracks 41 (substantially constant width across; lines 40-56, col. 2, fig. 1) between two common terminals 50 (corrosion-protected) on each side, on a substrate 20 (substrate with an insulative surface) (lines 25-67, col. 2, fig. 1; lines 1-5, col. 3). Kim also discloses that as each corrosive track is exposed to the corrosive environment is corroded and the resistance values are resultantly varied. Kim further discloses that as a result the resistance value of the electric resistance sensor 10 is varied, and such a variation of the resistance value may be measured by the current variation when the predetermined voltage is applied to the connecting units 30, 31 (lines 1-24, col. 4). Kim also discloses that when the predetermined current is applied to the connecting units, the variation of the resistance value can be measured by the voltage variation (lines 1-24, col. 4). Kim also discloses that the metal thin film 21 is deposited by one of several process, such as sputtering (lines 16-60, col. 3).

Kim does not disclose each bend has a minimum radius of curvature, which is greater than half the average width of the corrosive tracks.

Ansuini discloses corrosive tracks in a serpentine formation which have a radius of curvature greater than half the average width of the corrosive tracks. Ansuini further discloses that the serpentine configuration is for space-saving purposes (lines 51-66, col. 4, figs. 1&2).

It would have been obvious to modify the Kim device to include bends with a minimum radius of curvature which is greater than half the average width of the corrosive tracks such as taught by Ansuini in order to provide a corrosive track configuration which saves space. Further, with regard to claim 1, if the Kim device is taken to not have a plurality of mutually inverted generally U-shaped bends, it would have been obvious to modify the Kim device to include such a configuration with the plural tracks of Kim, such as taught by Ansuini, in order to save space as well as provide an obvious alternative arrangement of the tracks. Examiner asserts that such a change is an obvious modification that provides an alternative shape to the corrosive tracks in which such an alternative shape would maintain to have a reasonable expectation of success for the same desired purpose as in Kim.

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini as applied to claims 1-7 and in further view of Kordecki (EP0932037 A2).

Kim/Ansuini does not disclose a reference sensor that provides a measurable variation in resistivity in response to changes in temperature, which takes the same form as the resistivity sensor and is arranged in an overlapping manner to the resistivity sensor.

Kordecki discloses that conventional corrosion sensors include a temperature reference in conjunction with the sensor for performing temperature correction of any

changes in the measured resistance, and that these sensors often come in the arrangement of a Wheatstone bridge or Kelvin bridge (paragraphs 0003-0004).

It would have been obvious to modify the Kim/Ansuini device to include a reference sensor in the corrosion sensor device to provide a measurable variation in resistivity in response to temperatures changes such as taught by Kordecki in order to provide for temperature corrections of any changes in the measures resistance so as to yield proper results.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini as applied to claims 1-7 and in further view of Agarwala (5,338,432).

Kim/Ansuini does not disclose a galvanic sensor with at least one corrosive track made of a first metallic material and a thin film track made of a second, different, metallic material. Kim also does not disclose corrosive tracks with further tracks arranged in an interdigitated pattern.

Agarwala discloses corrosivity sensors, which have conductive elements 16a and 16b with strips 24a and 24b, as shown in fig. 1a-b. Agarwala also discloses that the conductive elements 16a and 16b may be of dissimilar metals so that one element may act as an anode and the other as an anode so that the presence of an electrolyte will generate galvanic current (lines 53-63, col. 3; lines 4-11, col. 4). Agarwala also discloses that the magnitude of the galvanic current will be indicative of the corrosivity of the electrolyte or environment (lines 56-58, col. 3). Agarwala also discloses that the

strips 24a and 24b of elements 16a and 16b are interdigitated so that the strips alternate between those of one conductive element and those of the other, and the strips 24a and 24b may form any interdigitated pattern (lines 12-22, col. 3).

It would have been obvious to modify the Kim/Ansuini device to include a galvanic sensor of different metal tracks and an interdigitated pattern of corrosive tracks such as taught by Agarwala in order to provide another means for determining the corrosivity of the electrolyte or environment and to form a pattern of conducive elements and resistive elements.

Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini as applied to claims 1-7 and in further view of Glass (5,437,773).

Kim/Ansuini does not disclose a platinum resistance thermometer for measuring a temperature where the microsensor is mounted. Kim also does not disclose that the corrosive tracks are made of a metallic alloy or an aluminum alloy.

Glass (‘773) discloses a method for monitoring corrosion that includes a resistance-temperature detector (RTD), which typically would be a platinum thin film or line of any dimension. Glass (‘773) discloses that the RTD will be used for temperature correction and will be incorporated as part of the array (lines 21-35, col. 12). Glass (‘773) also discloses that as illustrated in fig. 2, aluminum alloys such as 2024 and 7075 are used as corrosion potential rate sensors 15 and 16 (lines 11-32, col. 5). Glass (‘773) also discloses that the corrosion monitor apparatus may be applied to an aircraft

(lines 24-28, col. 5). Glass (‘773) also discloses that sputtering is used for deposition of the sensor materials (lines 40-42, col. 9).

It would have been obvious to modify the Kim/Ansuini device to include a platinum resistance thermometer and aluminum alloy sensor elements with additional application to an aircraft such as taught by Glass (‘773) in order to provide temperature correction means for measurements indicating changing conditions and a proper material for determining corrosion rates in changing environments, such as on aircrafts.

Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini and Glass (‘773) as applied to claims 13-15 and in further view of Kordecki (EP0932937 A2).

Kim/Ansuini/Glass (‘773) does not disclose that the apparatus comprises a metallic alloy that shares a metal with the alloy of the track. Kim/Ansuini/Glass (‘773) also does not disclose a second metallic component composed of a metallic alloy and a second metallic microsensor with a metallic alloy track. Kim/Ansuini/Glass (‘773) also does not disclose that the proportion of the alloying constituent in the track alloy is similar to the alloying constituent of the bulk alloy to within 3% or to within 1% of the total constituents of the bulk alloy.

Kordecki discloses a multi-purpose sensor with a conductive sensing element. Kordecki also discloses that the conductive sensing element may be formed from alloys of palladium or lead, palladium-gold, lead-bismuth, or lead-palladium. Kordecki also discloses an abrasion sensor 100 which includes a substrate 110, contact pads 120 and

130, and a conductor 140 (paragraph 0015, fig. 1). Kordecki also discloses that the conductor 140 is made from a bimetallic alloy of 1% to 99% palladium or a bimetallic alloy of 1% to 99% lead and is arranged on a substrate to form sensing element 160 (paragraph 0022-0023). Kordecki also discloses that the abrasion sensor is suitably made from a palladium-gold alloy of 5% to 95% palladium and a complementary percent of gold; the composition of the palladium-gold alloy of the abrasion sensor may be adjusted with its conductor 140 to meet custom criteria (paragraph 0022). Kordecki discloses that such bimetallic alloys will posses the highest resistivity and lowest TCR (Temperature Coefficient of Resistivity) that can be attained for the given alloy (paragraph 0022). Kordecki also disclose a corrosion sensor 200 and its corresponding conductor 240, and the above discussion on the abrasion sensor and its corresponding conductor is applicable except for in the chosen materials of construction (paragraphs 0024-0025). Kordecki discloses that the conductor 240 is made from a bimetallic alloy of 1% to 99% palladium or a bimetallic alloy of 1% to 99% lead and is arranged on a substrate to form sensing element 260 in a serpentine pattern (paragraphs 0026-0027). Kordecki also discloses that the corrosion sensor of a lead-palladium or lead-bismuth alloy of 5% to 95% lead and a complementary amount of palladium or bismuth is well-suited for corrosion sensors, and this percentage composition may be adjusted for its conductor 140 in order to achieve a certain resistivity and TCR (paragraph 0026). Kordecki also discloses a combination sensor 300, which incorporates the ideas of the above description for the abrasion and corrosion sensor (paragraphs 0028-0029).

It would have been obvious to modify the modified Kim/Ansuini/Glass (‘773) device to include the above elements taught by Kordecki in order to provide a multi-functional abrasion and corrosion sensor of the proper alloy compositions to achieve desirable resistivity and TCR. With regard to claim 20, these limitations are drawn to intended use of the apparatus and are not afforded any patentable weight.

Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini and Glass (‘773) as applied to claims 13-15 and in view of Glass (5,409,859).

Kim/Ansuini/Glass (‘773) does not disclose sputtering and annealing the thin film on to the substrate to encourage metallic grain growth.

Glass (‘859) discloses that the platinum layer may be annealed after it is deposited on the substrate, in which deposition of the platinum alloy may occur by sputtering (lines 20-22, 45-52, col. 6; and contents).

It would have been obvious to modify the modified Kim/Ansuini/Glass (‘773) device to include sputtering and then annealing the sputtered film to the substrate such as taught by Glass (‘859) in order to strengthen and provide durability to the film.

Response to Arguments

Applicant's arguments filed September 29th, 2010 have been fully considered but they are not persuasive.

Applicant argues that Kim does not teach a plurality of mutually inverted U-shaped bends in the corrosive tracks electrically connecting two common terminals.

Applicant further argues that Kim specifically teaches away from such "mutually inverted generally U-shaped bends." Applicant argues that Ansuini teaches only a single corrosive track connecting two terminals and Ansuini teaches only one of the two tracks illustrated is exposed to the corrosive media and the other track is covered with a protective coating so as to act as a comparison uncorroded track.

Examiner first asserts that the Kim patent has been utilized as the primary reference and the Ansuini patent has been utilized as the secondary reference in providing to disclose the elements of the claims. Examiner further argues that Kim does teach a plurality of corrosive tracks 41 connecting two common terminals 50. As discussed above in the body of the action, Examiner asserts that if the Kim device is taken to not have a plurality of mutually inverted generally U-shaped bends, it would have been obvious to modify the Kim device to include such a configuration with the plural tracks of Kim, such as taught by Ansuini, in order to save space. Examiner asserts that such a change is an obvious modification that provides an alternative shape to the corrosive tracks in which such an alternative shape would maintain to have a reasonable expectation of success for the same desired purpose as in Kim.

Further, with regard to the argument that Ansuini fails to teach a plurality of corrosive tracks, Examiner argues that the modification of Kim in view of Ansuini does not rely on the teachings of Ansuini to include a plurality of corrosive tracks. Ansuini, as discussed above, has been provided for disclosure toward the use of mutually inverted U-shaped bends within a corrosive track. Given the usage of a plurality of uniformly-shaped, corrosive tracks as taught in Kim, one of ordinary skill in the art would apply the

mutually inverted U-shaped bend shape to all of the plurality of tracks of Kim to maintain such a uniformity and constant application that would provide to remove variability in assay measurements that may arise given a non-uniform application of the tracks' shape.

Applicant further asserts that having responded to all objections and rejections previously noted by the Examiner and the Board it is submitted that amended claim 1 clearly defines over the cited prior art and notice to that effect is respectfully requested. Applicant thereby submits that remaining claims 1-22 are in condition for allowance.

Examiner submits that for the reasons discussed above, and as discussed in previous actions on the merits including the Examiner's Answer mailed on July 17th, 2008, and the Board's decision mailed on September 15th 2009, claims 1-22 are maintained as rejected.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NEIL TURK whose telephone number is (571)272-8914. The examiner can normally be reached on M-F, 9-630.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NT

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1773